

Claims

5 1 Process for constructing a 3D scene model by analysing image sequences, each image corresponding to a viewpoint defined by its position and its orientation, characterized in that it comprises the following steps:

- calculation, for an image, of a depth map (1) corresponding to the depth, in 3D space, of the pixels of the image,
- calculation, for an image, of a resolution map (2) corresponding to the 3D resolution of the pixels of the image, from the depth map,
- 10 - matching (6) of a pixel of a current image with a pixel of another image of the sequence, pixels relating to one and the same point of the 3D scene, by projecting the pixel of the current image onto the other image,
- selection of a pixel of the current image (6) depending on its resolution and on that of the pixels of other images of the sequence matched with this pixel,
- 15 - construction of the 3D model (8) from the selected pixels.

20 2 Process according to Claim 1, characterized in that the selected pixels of an image constitute one or more regions, weights are calculated and allocated to the pixels of the image (4) depending on whether or not they belong to the regions and on the geometrical characteristics of the regions to which they belong in the image and in that a new selection of the pixels (6) is performed depending on the resolution and weight values assigned to the
25 pixels.

30 3 Process according to Claim 2, characterized in that a relevance value (5) is assigned to each pixel of an image depending on the weight and on the resolution which have been assigned to this pixel and in that a selection of the pixels (6) of a current image is performed on the basis of the highest relevance value (5) among the matched pixels in order to give a mask of selected pixels.

35 4 Process according to Claim 1, characterized in that a partitioning (2) of the images of the sequence is performed by identifying, for a current image, the images whose corresponding viewpoints have an observation field possessing an intersection with the observation field relating to the current

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image, so as to form a list of images associated therewith, and in that the other images of the sequence for which the matching of the pixels of the current image (6) is performed are the images of its list.

5 5 Process according to Claim 4, characterized in that a partitioning (2) of the images of the sequence is performed by removing, from the list associated with an image, the images which possess too few pixels corresponding to those of the current image.

10 6 Process according to Claim 3, characterized in that the operations of calculating the weights (4), of calculating the relevance (5) and of selecting the pixels are repeated until the masks obtained from the selection no longer change significantly.

15 7 Process according to Claim 3, characterized in that the operations of matching a pixel of the current image, by projection on the other images, are stopped for this pixel as soon as a corresponding pixel having a higher relevance value has been found.

20 8 Process according to Claim 3, characterized in that the selection on the basis of the relevance values is performed when the ratio of the resolution values of the matched pixels lies within predefined limits.

25 9 Process according to Claim 1, characterized in that the pixel of the other image is the pixel closest to the projection point (6) on this other image.

30 10 Process according to Claim 1, characterized in that the moving objects which move in the scene are detected in order to be extracted therefrom so as to obtain a static-type scene.

35 11 Process of navigation in a 3D scene consisting in creating images as a function of the movement of the viewpoint, characterized in that the images are created on the basis of the process for constructing the 3D model according to Claim 1.

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